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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV. 11-2000)		ATTORNEY'S DOCKET NUMBER T706-11
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 CFR 1.5 UNKNOWN 09/807887
INTERNATIONAL APPLICATION NO. PCT/US99/28628	INTERNATIONAL FILING DATE 02 DECEMBER 1999	PRIORITY DATE CLAIMED 03 DECEMBER 1998
TITLE OF INVENTION CONSUMER PROFILING AND ADVERTISEMENT SELECTION SYSTEM		
APPLICANT(S) FOR DO/EO/US ELDERING, Charles A.		
Applicant hereby submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
<ol style="list-style-type: none"> <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). <input type="checkbox"/> has been communicated by the International Bureau. <input checked="" type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). <input type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> <input type="checkbox"/> is attached hereto. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). <input checked="" type="checkbox"/> have been communicated by the International Bureau. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. <input type="checkbox"/> have not been made and will not be made. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). <input type="checkbox"/> An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 		
Items 11 to 20 below concern document(s) or information included: <ol style="list-style-type: none"> <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. <input type="checkbox"/> A substitute specification. <input type="checkbox"/> A change of power of attorney and/or address letter. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). <input type="checkbox"/> Other items or information: 		



APR

18-2001
U.S. APPLICATION NO. (PCT) 01/000000
UNKNOWNINTERNATIONAL APPLICATION NO
PCT/US99/28628ATTORNEY'S DOCKET NUMBER
T706-11

97807887

ADVICE: The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO. **\$1000.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **\$860.00**

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **\$710.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **\$690.00**

International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **\$100.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =

Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).			
\$ 0.00			

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	98 - 20 =	78	x \$18.00
Independent claims	19 - 3 =	16	x \$80.00

MULTIPLE DEPENDENT CLAIM(S) (if applicable) 0 + \$270.00			
\$ 0.00			

TOTAL OF ABOVE CALCULATIONS =

<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			
+ \$ 1,392.00			

SUBTOTAL =

Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			
\$			

TOTAL NATIONAL FEE =

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property + \$ 40.00			
\$ 1,392.00			

TOTAL FEES ENCLOSED =

\$ 1,432.00			
Amount to be refunded: \$			

charged: \$			
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- a. A check in the amount of \$ _____ to cover the above fees is enclosed.
- b. Please charge my Deposit Account No. 501535 in the amount of \$ 1,432.00 to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 501535. A duplicate copy of this sheet is enclosed.
- d. Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SIGNATURE

Douglas J. Ryder

NAME

43,073

REGISTRATION NUMBER



09/807887
JC03 Rec'd PCT/PTO 19 APR 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

		DKT. NO. T706-11
INTERNATIONAL APPLICATION NO.	PCT/US99/28628	INTERNATIONAL FILING DATE 02 DECEMBER 1999
APPLICANT	EXPANSE NETWORKS, INC.	PRIORITY DATE 03 DECEMBER 1998
TITLE	CONSUMER PROFILING AND ADVERTISEMENT SELECTION SYSTEM	

Assistant Commissioner for Patents
Washington, DC 20231

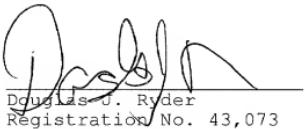
PRELIMINARY AMENDMENT

Please amend the application as follows prior to
Examining the Application:

In the Claims

Please cancel claims 45, 46, 66 and 70-72 without
prejudice or disclaimer to the subject matter contained
therein.

Respectfully submitted,


Douglas J. Ryder
Registration No. 43,073

Date: 4/17/01

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TITLE

Consumer profiling and advertisement selection system

Background of the Invention

5 The advent of the Internet has resulted in the ability to communicate data across the globe instantaneously, and will allow for numerous new applications which enhance consumer's lives. One of the enhancements which can occur is the ability for the consumer to receive advertising which
10 is relevant to their lifestyle, rather than a stream of ads determined by the program they are watching. Such "targeted ads" can potentially reduce the amount of unwanted information which consumers receive in the mail, during television programs, and when using the Internet. Examples
15 of editorial targeting can be found on the World Wide Web, where banners are delivered based on the page content. The product literature from DoubleClick, "Dynamic Advertising Reporting and Targeting (DART)," printed from the World Wide Web site <http://www.doubleclick.net/dart> on June 19, 1998
20 discloses DoubleClick's advertising solution for matching advertiser's selected targeted profiles with individual user profiles and deliver an appropriate banner. The user and advertisements are matched based on geographic location or keywords on the page content. The product literature from
25 Imgis, "Ad Force," printed from the World Wide Web site <http://www.starpt.com/core> on June 30, 1998 discloses an ad management system for targeting users and delivering advertisements to them. Users are targeted based on the type of content they are viewing or by keywords.

30 From an advertiser's perspective the ability to target ads can be beneficial since they have some confidence that their ad will at least be determined relevant by the consumer, and therefore will not be found annoying because it is not applicable to their lifestyle. Different systems

for matching a consumer profile to an advertisement have been proposed such as the U.S. Patent No. 5,774,170, which discloses a system for delivering targeted advertisement to consumers. In this system, a set of advertisements is tagged 5 with commercial identifier (CID) and, from the existing marketing database, a list of prospective viewers is also identified with CID. The commercials are displayed to the consumers when the CIDs match.

Other systems propose methods for delivering 10 programming tailored to subscribers' profile. U.S. Patent No. 5,446,919 discloses a communication system capable of targeting a demographically or psychographically defined audience. Demographic and psychographic information about audience member are downloaded and stored in the audience member receiver. Media messages are transmitted to audience 15 member along with a selection profile command, which details the demographic/psychographic profile of audience members that are to receive each media message. Audience members which fall within a group identified by the selection 20 profile command are presented with the media message.

U.S. Patent No. 5,223,924 discloses a system and method for automatically correlating user preferences with a TV program information database. The system includes a processor that performs "free text" search techniques to 25 correlate the downloaded TV program information with the viewer's preferences. U.S. Patent No. 5,410,344 discloses a method for selecting audiovideo programs based on viewers' preferences, wherein each of the audiovideo programs has a plurality of programs attributes and a corresponding content 30 code representing the program attributes. The method comprises the steps of storing a viewer preference file, which includes attributes ratings, which represents the degree of impact of the programs attributes on the viewer and, in response to the comparison of viewer preference file

with the program content codes, a program is selected for presentation to the viewer.

In order to determine the applicability of an advertisement to a consumer, it is necessary to know something about their lifestyle, and in particular to understand their demographics (age, household size and income). In some instances, it is useful to know their particular purchasing habits. Purchasing habits are being used by E-commerce to profile their visitors. As an example, the product literature from Aptex software Inc., "SelectCast for Commerce Servers," printed from the World Wide Web site <http://www.aptex.com/products-selectcast-commerce.htm> on June 30, 1998 discloses the product SelectCast for Commerce Servers. The product personalizes online shopping based on observed user behavior. User interests are learned based on the content they browse, the promotions they click and the products they purchase.

Knowledge of the purchasing habits of a consumer can be beneficial to a product vendor in the sense that a vendor of soups would like to know which consumers are buying their competitor's soup, so that they can target ads at those consumers in an effort to convince them to switch brands. That vendor will probably not want to target loyal customers, although for a new product introduction the strategy may be to convince loyal customers to try the new product. In both cases it is extremely useful for the vendor to be able to determine what brand of product the consumer presently purchases.

There are several difficulties associated with the collection, processing, and storage of consumer data. First, collecting consumer data and determining the demographic parameters of the consumer can be difficult. Surveys can be performed, and in some instances the consumer will willingly give access to normally private data

including family size, age of family members, and household income. In such circumstances there generally needs to be an agreement with the consumer regarding how the data will be used. If the consumer does not provide this data 5 directly, the information must be "mined" from various pieces of information which are gathered about the consumer, typically from specific purchases.

A relatively intrusive method for collecting consumer information is described in U.S. Patent No. 4,546,382, which 10 discloses a television and market research data collection system and method. A data collection unit containing a memory, stores data as to which of the plurality of TV modes are in use, which TV channel is being viewed as well as input from a suitable optical scanning device for collecting 15 consumer product purchases.

Once data is collected, usually from one source, some type of processing can be performed to determine a particular aspect of the consumer's life. As an example, processing can be performed on credit data to determine 20 which consumers are a good credit risk and have recently applied for credit. The resulting list of consumers can be solicited, typically by direct mail. Although information such as credit history is stored on multiple databases, storage of other information such as the specifics of 25 grocery purchases is not typically performed. Even if each individual's detailed list of grocery purchases was recorded, the information would be of little use since it would amount to nothing more than unprocessed shopping lists.

30 Privacy concerns are also an important factor in using consumer purchase information. Consumers will generally find it desirable that advertisements and other information is matched with their interests, but will not allow

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indiscriminate access to their demographic profile and purchase records.

The Internet has spawned the concept of "negatively priced information" in which consumers can be paid to receive advertising. Paying consumers to watch advertisements can be accomplished interactively over the Internet, with the consumer acknowledging that they will watch an advertisement for a particular price. Previously proposed schemes such as that described in U.S. Patent 10 5,794,210, entitled "Attention Brokerage," of which A. Nathaniel Goldhaber and Gary Fitts are the inventors, describe such a system, in which the consumer is presented with a list of advertisements and their corresponding payments. The consumer chooses from the list and is compensated for viewing the advertisement. The system uses also software agents representing consumers to match the consumer interest profiles with advertisements. The matching is done using "relevance indexing" which is based on hierarchical tree structures. The system requires real-time 20 interactivity in that the viewer must select the advertisement from the list of choices presented.

The ability to place ads to consumers and compensate them for viewing the advertisements opens many possibilities for new models of advertising. However, it is important to 25 understand the demographics and product preferences of the consumer in order to be able to determine if an advertisement is appropriate.

Although it is possible to collect statistical information regarding consumers of particular products and 30 compare those profiles against individual demographic data points of consumers, such a methodology only allows for selection of potential consumers based on the demographics of existing customers of the same or similar products.

U.S. Patent 5,515,098, entitled "System and method for selectively distributing commercial messages over a communications network," of which John B. Carles is the inventor, describes a method in which target household data 5 of actual customers of a product are compared against subscriber household data to determine the applicability of a commercial to a household. Target households for a product or service are characterized by comparing or correlating the profile of the customer household to the profile of all 10 households. A rating is established for each household for each category of goods/services. The households within a predefined percentile of subscribers, as defined by the rating, are targeted by the advertiser of the product or service.

15 It will also frequently be desirable to target an advertisement to a market having discretionary characteristics and to obtain a measure of the correlation of these discretionary features with probabilistic or deterministic data of the consumer/subscriber, rather than 20 being forced to rely on the characteristics of existing consumers of a product. Such correlation should be possible based both on demographic characteristics and product preferences.

Another previously proposed system, described in U.S. 25 Patent 5,724,521, entitled "Method and apparatus for providing electronic advertisements to end users in a consumer best-fit pricing manner," of which R. Dedrick is the inventor, utilizes a consumer scale as the mechanism to determine to which group an advertisement is intended. A 30 consumer scale matching process compares the set of characteristics stored in a user profile database to a consumer scale associated with the electronic advertisement. The fee charged to the advertiser is determined by where the set of characteristics fall on the consumer scale. Such a

system requires specification of numerous parameters and weighting factors, and requires access to specific and non-statistical personal profile information.

For the foregoing reasons, there is a need for a consumer profiling system which can profile the consumer, provide access to the consumer profile in a secure manner, and return a measurement of the potential applicability of an advertisement. There is also a need for an advertisement selection system which can match an advertisement with discretionary target market characteristics, and which can do so in a manner which protects the privacy of the consumer data and characterizations.

Summary of the Invention

The present invention supports the receipt of consumer purchase information with which consumer characterization vectors are updated based on product characterization information. The consumer characterization vectors include a consumer demographic vector which provides a probabilistic measure of the demographics of the consumer, and a product preference vector which describes which products the consumer has typically purchased in the past, and therefore is likely to purchase in the future. The product characterization information includes vector information which represents probabilistic determinations of the demographics of purchasers of an item, heuristic rules which can be applied to probabilistically describe the demographics of the consumer based on that purchase, and a vector representation of the purchase itself.

In a preferred embodiment a computer-readable detailed purchase record is received, along with a unique consumer identifier. A demographic characterization vector corresponding to the consumer can be retrieved. In the event that there is no existing demographic characterization

vector for that consumer, a new demographic characterization vector can be created. In a preferred embodiment the new demographic characterization vector contains no information. A set of heuristic rules is retrieved and contains a 5 probabilistic measure of the demographic characteristics of a typical purchaser of an item. A new demographic characterization vector is calculated based on the purchase, the existing demographic characterization vector, and the heuristic rules.

10 In a preferred embodiment the calculation of the demographic characterization vector is performed by calculating a weighted average of a product demographics vector and the existing demographic characterization vector. A weighting factor is used in which the weighting factor is 15 determined based on the ratio of the current product purchase amount to a cumulative product purchase amount. The cumulative product purchase amount can be measured as the amount spent on a particular category of items (e.g. groceries, clothes, accessories) over a given period of time 20 such as one month or one year.

In a preferred embodiment the heuristic rules are in the form of a product demographics vector which states the demographics of known purchasers of an item. Each product can have an associated product demographics vector.

25 The present invention can be used to develop product preference descriptions of consumers which describe the brand and size product that they purchase, and which provide a probabilistic interpretation of the products they are likely to buy in the future. The product preference 30 description can be generated by creating a weighted average of an existing product preference vector describing the consumer's historical product preferences (type of product, brand, and size) and the characteristics of recent purchases.

The present invention can be realized as a data processing system or computer program which processes consumer purchase records and updates their demographic and product preference profiles based on the use of product characterization information. The data processing system can also be used to receive information regarding an advertisement and to perform a correlation between the advertisement and the consumer's demographic and product preferences.

10 The present invention can be realized as software resident on one or more computers. The system can be realized on an individual computer which receives information regarding consumer purchases, or can be realized on a network of computers in which portions of the system 15 are resident on different computers.

One advantage of the present invention is that it allows consumer profiles to be updated automatically based on their purchases, and forms a description of the consumer including demographic characteristics and product preferences. This description can be used by advertisers to 20 determine the suitability of advertisements to the consumer. Consumers benefit from the system since they will receive advertisements which are more likely to be applicable to them.

25 The present invention can be used to profile consumers to support the correlation of an advertisement characterization vector associated with an advertisement with the consumer characterization vector to determine the applicability of the advertisement to the consumer.

30 Another feature of the present invention is the ability to price access to the consumer based on the degree of correlation of an advertisement with their profile. If an advertisement is found to be very highly correlated with a consumer's demographics and product preferences, a

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relatively high price can be charged for transmitting the advertisement to the consumer. From the consumer's perspective, if the correlation between the advertisement and the consumer's demographics or product preferences is 5 high the consumer can charge less to view the ad, since it is likely that is will be of interest.

The present invention also describes a system for determining the applicability of an advertisement to a consumer, based on the reception of an ad characterization 10 vector and use of a unique consumer ID. The consumer ID is used to retrieve a consumer characterization vector, and the correlation between the consumer characterization vector and the ad characterization vector is used to determine the applicability of the advertisement to the consumer. The 15 price to be paid for presentation of the advertisement can be determined based on the degree of correlation.

The price to present an advertisement can increase with correlation, as may be typical when the content/opportunity provider is also the profiling entity. The price can 20 decrease with correlation when the consumer is the profiler, and is interested in, and willing to charge less for seeing advertisements which are highly correlated with their demographics, lifestyle, and product preferences.

The present invention can be used to specify purchasers 25 of a specific product. In a preferred embodiment the advertisement characterization vector contains a description of a target market including an indicator of a target product, i.e., purchasers of a particular product type, brand, or product size. The advertisement characterization 30 vector is correlated with a consumer characterization vector which is retrieved based on a unique consumer ID. The correlation factor is determined and indicates if the consumer is a purchaser of the product the advertisement is intended for. This feature can be used to identify

5 purchasers of a particular brand and can be used to target ads at those consumers to lure them away from their present product provider. Similarly, this feature can be used to target ads to loyal consumers to introduce them to a new product in a product family, or different size of product.

One advantage of the present invention is that discretionary target market parameters can be specified and do not necessarily need to correspond to an existing market, but can reflect the various market segments for which the 10 advertisement is targeted. The market segments can be designated by demographic characteristics or by product preferences.

15 Another advantage of the present invention is that demographic samples of present purchasers of a product are not required to define the target market.

The present invention can be used to determine the applicability of an advertisement to a consumer based on demographics, product preferences, or a combination of both.

20 In a preferred embodiment of the present invention the correlation is calculated as the scalar product of the ad characterization vector and the consumer characterization vector. The ad characterization vector and consumer characterization vector can be composed of demographic characteristics, product purchase characteristics, or a 25 combination of both.

In a preferred embodiment pricing for the displaying of said advertisement is developed based on the result of the correlation between the ad characterization vector and the consumer characterization vector. In a first embodiment the 30 pricing increases as a function of the correlation. This embodiment can represent the situation in which the party which determines the correlation also controls the ability to display the advertisement.

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5 In an alternate embodiment the price for displaying the advertisement decreases as a function of the degree of correlation. This embodiment can represent the situation in which the consumer controls access to the consumer characterization vector, and charges less to view advertisements which are highly correlated with their interests and demographics. A feature of this embodiment is the ability of the consumer to decrease the number of unwanted advertisements by charging a higher price to view 10 advertisements which are likely to be of less interest.

One advantage of the present invention is that it allows advertisements to be directed to new markets by setting specific parameters in the ad characterization vector, and does not require specific statistical knowledge 15 regarding existing customers of similar products. Another advantage is that the system allows ads to be directed at consumers of a competing brand, or specific targeting at loyal customers. This feature can be useful for the introduction of a new product to an existing customer base.

20 Another advantage of the present invention is that the correlation can be performed by calculating a simple scalar (dot) product of the ad characterization and consumer characterization vectors. A weighted sum or other statistical analysis is not required to determine the 25 applicability of the advertisement.

The present invention can be realized as a data processing system and as a computer program. The invention can be realized on an individual computer or can be realized using distributed computers with portions of the system 30 operating on various computers.

An advantage of the present invention is the ability to direct advertisements to consumers which will find the advertisements of interest. This eliminates unwanted advertisements. Another advantage is the ability of

advertisers to target specific groups of potential customers.

These and other features and objects of the invention will be more fully understood from the following detailed 5 description of the preferred embodiments which should be read in light of the accompanying drawings.

Brief Description of the Drawings

The accompanying drawings, which are incorporated in 10 and form a part of the specification, illustrate the embodiments of the present invention and, together with the description serve to explain the principles of the invention.

In the drawings:

15 FIGS. 1A and 1B show user relationship diagrams for the present invention;

FIGS. 2A, 2B, 2C and 2D illustrate a probabilistic consumer demographic characterization vector, a deterministic consumer demographic characterization vector, 20 a consumer product preference characterization vector, and a storage structure for consumer characterization vectors respectively;

FIGS. 3A and 3B illustrate an advertisement demographic characterization vector and an advertisement product 25 preference characterization vector respectively;

FIG. 4 illustrates a computer system on which the present invention can be realized;

FIG. 5 illustrates a context diagram for the present invention;

30 FIGS. 6A and 6B illustrate pseudocode updating the characteristics vectors and for a correlation operation respectively;

FIG. 7 illustrates heuristic rules;

FIGS. 8A and 8B illustrate flowcharts for updating consumer characterization vectors and a correlation operation respectively; and

FIG. 9 represents pricing as a function of correlation.

5 FIG. 10 illustrates a representation of a consumer characterization as a set of basis vectors and an ad characterization vector.

Detailed Description

of the Preferred Embodiment

10 In describing a preferred embodiment of the invention illustrated in the drawings, specific terminology will be used for the sake of clarity. However, the invention is not intended to be limited to the specific terms so selected, 15 and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

With reference to the drawings, in general, and FIGS. 1 through 10 in particular, the method and apparatus of the 20 present invention is disclosed.

FIG. 1A shows a user relationship diagram which illustrates the relationships between a consumer profiling system and various entities. As can be seen in FIG. 1, a consumer 100 can receive information and advertisements from 25 a consumer personal computer (PC) 104, displayed on a television 108 which is connected to a settop 106, or can receive a mailed ad 182.

30 Advertisements and information displayed on consumer PC 104 or television 108 can be received over an Internet 150, or can be received over the combination of the Internet 150 with another telecommunications access system. The telecommunications access system can include but is not limited to cable TV delivery systems, switched digital video access systems operating over telephone wires, microwave

telecommunications systems, or any other medium which provides connectivity between the consumer 100 and a content server 162 and ad server 146.

A content/opportunity provider 160 maintains the 5 content server 162 which can transmit content including broadcast programming across a network such as the Internet 150. Other methods of data transport can be used including private data networks and can connect the content sever 160 through an access system to a device owned by consumer 100.

10 Content/opportunity provider 160 is termed such since if consumer 100 is receiving a transmission from content server 162, the content/opportunity provider can insert an advertisement. For video programming, content/opportunity provider is typically the cable network operator or the 15 source of entertainment material, and the opportunity is the ability to transmit an advertisement during a commercial break.

The majority of content that is being transmitted today is done so in broadcast form, such as broadcast television 20 programming (broadcast over the air and via cable TV networks), broadcast radio, and newspapers. Although the interconnectivity provided by the Internet will allow consumer specific programming to be transmitted, there will still be a large amount of broadcast material which can be 25 sponsored in part by advertising. The ability to insert an advertisement in a broadcast stream (video, audio, or mailed) is an opportunity for advertiser 144. Content can also be broadcast over the Internet and combined with existing video services, in which case opportunities for the 30 insertion of advertisements will be present.

Although FIG. 1A represents content/opportunity provider 160 and content server 162 as being independently connected to Internet 150, with the consumer's devices being also being directly connected to the Internet 150, the

content/opportunity provider 160 can also control access to the subscriber. This can occur when the content/opportunity provider is also the cable operator or telephone company. In such instances, the cable operator or telephone company can 5 be providing content to consumer 100 over the cable operator/telephone company access network. As an example, if the cable operator has control over the content being transmitted to the consumer 100, and has programmed times for the insertion of advertisements, the cable operator is 10 considered to be a content/opportunity provider 160 since the cable operator can provide advertisers the opportunity to access consumer 100 by inserting an advertisement at the commercial break.

In a preferred embodiment of the present invention, a 15 pricing policy can be defined. The content/opportunity provider 160 can charge advertiser 144 for access to consumer 100 during an opportunity. In a preferred embodiment the price charged for access to consumer 100 by content/opportunity provider varies as a function of the 20 applicability of the advertisement to consumer 100. In an alternate embodiment consumer 100 retains control of access to the profile and charges for viewing an advertisement.

The content provider can also be a mailing company or printer which is preparing printed information for consumer 25 100. As an example, content server 162 can be connected to a printer 164 which creates a mailed ad 182 for consumer 100. Alternatively, printer 164 can produce advertisements for insertion into newspapers which are delivered to consumer 100. Other printed material can be generated by printer 162 30 and delivered to consumer 100 in a variety of ways.

Advertiser 144 maintains an ad server 146 which contains a variety of advertisements in the form of still video which can be printed, video advertisements, audio advertisements, or combinations thereof.

Profiler 140 maintains a consumer profile server 130 which contains the characterization of consumer 100. The consumer profiling system is operated by profiler 140, who can use consumer profile server 130 or another computing device connected to consumer profile server 130 to profile consumer 100.

Data to perform the consumer profiling is received from a point of purchase 110. Point of purchase 110 can be a grocery store, department store, other retail outlet, or can 10 be a web site or other location where a purchase request is received and processed. In a preferred embodiment, data from the point of purchase is transferred over a public or private network 120, such as a local area network within a store or a wide area network which connects a number of 15 department or grocery stores. In an alternate embodiment the data from point of purchase 110 is transmitted over the Internet 150 to profiler 140.

Profiler 140 may be a retailer who collects data from its stores, but can also be a third party who contracts with 20 consumer 100 and the retailer to receive point of purchase data and profile consumer 100. Consumer 100 may agree to such an arrangement based on the increased convenience offered by targeted ads, or through a compensation arrangement in which they are paid on a periodic basis for 25 revealing their specific purchase records.

Consumer profile server 130 can contain a consumer profile which is determined from observation of the consumer's viewing habits on television 108 or consumer PC 104. Determination of demographic and product preference 30 information based on the consumer's use of services such as cable television and Internet access can be performed by monitoring the channel selections that a subscriber makes, and determining household demographics based on the

subscriber selections and information associated with the programming being watched.

In one embodiment the channel selections are recorded, and based on the time of day during which the programming is watched and duration of viewing, heuristic rules are applied to make probabilistic determinations regarding the household demographics including age, gender, household size and income, as illustrated in FIG. 2A. This can be accomplished by applying heuristic rules which associate the programming with known and assumed characteristics for viewers of the programming. As an example, it is known that the probability that the viewer of a cartoon in the morning is in the 3-8 year old age group is high, thus if the household viewing habits consistently record viewing of cartoons the probability that the household will contain one or more viewers in the 3-8 year old age group is high.

In one embodiment information regarding the program is extracted from the Electronic Program Guide (EPG) which contains information regarding the scheduled programming. In another embodiment information regarding the programming is retrieved from the closed caption channel transmitted in the broadcast signal.

The volume at which the program is watched can also be stored and forms an additional basis for subscriber characterization, wherein the muting of a channel indicates limited interest in a particular program or advertisement. In the case of an advertisement, muting of the advertisement can be used as a measure of the effectiveness (or ineffectiveness) of the advertisement and can serve as part of the basis for the subscriber characterization. The muting of a program, as well as the duration for which the program is watched, can also be used in the determination of the subscriber characterization vector.

By processing the recorded viewing habits in conjunction with programming related information and heuristic rules similar to those illustrated in FIG. 7 but related to programming rather than purchases, it is possible 5 to construct a subscriber characterization vector which contains a probabilistic demographic profile of the household.

When used herein, the term consumer characterization vector also represents the subscriber characterization 10 vector previously described. Both the consumer characterization vector and the subscriber characterization vector contain demographic and product preference information which is related to consumer 100.

FIG. 1B illustrates an alternate embodiment of the 15 present invention in which the consumer 100 is also profiler 140. Consumer 100 maintains consumer profile server 130 which is connected to a network, either directly or through consumer PC 104 or settop 106. Consumer profile server 130 can contain the consumer profiling system, or the profiling 20 can be performed in conjunction with consumer PC 104 or settop 106. A subscriber characterization system which monitors the viewing habits of consumer 100 can be used in conjunction with the consumer profiling system to create a more accurate consumer profile.

25 When the consumer 100 is also the profiler 140, as shown in FIG. 1B, access to the consumer demographic and product preference characterization is controlled exclusively by consumer 100, who will grant access to the profile in return for receiving an increased accuracy of 30 ads, for cash compensation, or in return for discounts or coupons on goods and services.

FIG. 2A illustrates an example of a probabilistic demographic characterization vector. The demographic characterization vector is a representation of the

probability that a consumer falls within a certain demographic category such as an age group, gender, household size, or income range.

In a preferred embodiment the demographic characterization vector includes interest categories. The interest categories may be organized according to broad areas such as music, travel, and restaurants. Examples of music interest categories include country music, rock, classical, and folk. Examples of travel categories include "travels to another state more than twice a year," and "travels by plane more than twice a year."

FIG. 2B illustrates a deterministic demographic characterization vector. The deterministic demographic characterization vector is a representation of the consumer profile as determined from deterministic rather than probabilistic data. As an example, if consumer 100 agrees to answer specific questions regarding age, gender, household size, income, and interests the data contained in the consumer characterization vector will be deterministic.

As with probabilistic demographic characterization vectors, the deterministic demographic characterization vector can include interest categories. In a preferred embodiment, consumer 100 answers specific questions in a survey generated by profiler 140 and administered over the phone, in written form, or via the Internet 150 and consumer PC 104. The survey questions correspond either directly to the elements in the probabilistic demographic characterization vector, or can be processed to obtain the deterministic results for storage in the demographic characterization vector.

FIG. 2C illustrates a product preference vector. The product preference represents the average of the consumer preferences over past purchases. As an example, a consumer who buys the breakfast cereal manufactured by Post under the

trademark ALPHABITS about twice as often as purchasing the breakfast cereal manufactured by Kellogg under the trademark CORN FLAKES, but who never purchases breakfast cereal manufactured by General Mills under the trademark WHEATIES, 5 would have a product preference characterization such as that illustrated in FIG. 2C. As shown in FIG. 2C, the preferred size of the consumer purchase of a particular product type can also be represented in the product preference vector.

10 FIG. 2D represents a data structure for storing the consumer profile, which can be comprised of a consumer ID field 237, a deterministic demographic data field 239, a probabilistic demographic data field 241, and one or more product preference data fields 243. As shown in FIG. 2D, 15 the product preference data field 243 can be comprised of multiple fields arranged by product categories 253.

Depending on the data structure used to store the information contained in the vector, any of the previously mentioned vectors may be in the form of a table, record, 20 linked tables in a relational database, series of records, or a software object.

The consumer ID 512 can be any identification value uniquely associated with consumer 100. In a preferred embodiment consumer ID 512 is a telephone number, while in 25 an alternate embodiment consumer ID 512 is a credit card number. Other unique identifiers include consumer name with middle initial or a unique alphanumeric sequence, the consumer address, social security number.

The vectors described and represented in FIGS. 2A-C 30 form consumer characterization vectors that can be of varying length and dimension, and portions of the characterization vector can be used individually. Vectors can also be concatenated or summed to produce longer vectors which provide a more detailed profile of consumer 100. A

matrix representation of the vectors can be used, in which specific elements, such as product categories 253, are indexed. Hierarchical structures can be employed to organize the vectors and to allow hierarchical search 5 algorithms to be used to locate specific portions of vectors.

FIGS. 3A and 3B represent an ad demographics vector and an ad product preference vector respectively. The ad demographics vector, similar in structure to the demographic 10 characterization vector, is used to target the ad by setting the demographic parameters in the ad demographics vector to correspond to the targeted demographic group. As an example, if an advertisement is developed for a market which is the 18-24 and 24-32 age brackets, no gender bias, with a 15 typical household size of 2-5, and income typically in the range of \$20,000-\$50,000, the ad demographics vector would resemble the one shown in FIG. 3A. The ad demographics vector represents a statistical estimate of who the ad is intended for, based on the advertisers belief that the ad 20 will be beneficial to the manufacturer when viewed by individuals in those groups. The benefit will typically be in the form of increased sales of a product or increased brand recognition. As an example, an "image ad" which simply shows an artistic composition but which does not 25 directly sell a product may be very effective for young people, but may be annoying to older individuals. The ad demographics vector can be used to establish the criteria which will direct the ad to the demographic group of 18-24 year olds.

30 FIG. 3B illustrates an ad product preference vector. The ad product preference vector is used to select consumers which have a particular product preference. In the example illustrated in FIG. 3B, the ad product preference vector is set so that the ad can be directed a purchasers of ALPHABITS

and WHEATIES, but not at purchasers of CORN FLAKES. This particular setting would be useful when the advertiser represents Kellogg and is charged with increasing sales of CORN FLAKES. By targeting present purchasers of ALPHABITS 5 and WHEATIES, the advertiser can attempt to sway those purchasers over to the Kellogg brand and in particular convince them to purchase CORN FLAKES. Given that there will be a payment required to present the advertisement, in the form of a payment to the content/opportunity provider 10 160 or to the consumer 100, the advertiser 144 desires to target the ad and thereby increase its cost effectiveness.

In the event that advertiser 144 wants to reach only the purchasers of Kellogg's CORN FLAKES, that category would be set at a high value, and in the example shown would be 15 set to 1. As shown in FIG. 3B, product size can also be specified. If there is no preference to size category the values can all be set to be equal. In a preferred embodiment the values of each characteristic including brand and size are individually normalized.

20 Because advertisements can be targeted based on a set of demographic and product preference considerations which may not be representative of any particular group of present consumers of the product, the ad characterization vector can be set to identify a number of demographic groups which 25 would normally be considered to be uncorrelated. Because the ad characterization vector can have target profiles which are not representative of actual consumers of the product, the ad characterization vector can be considered to have discretionary elements. When used herein the term 30 discretionary refers to a selection of target market characteristics which need not be representative of an actual existing market or single purchasing segment.

In a preferred embodiment the consumer characterization vectors shown in FIGS. 2A-C and the ad characterization

vectors represented in FIGS. 3A and 3B have a standardized format, in which each demographic characteristic and product preference is identified by an indexed position. In a preferred embodiment the vectors are singly indexed and thus 5 represent coordinates in n-dimensional space, with each dimension representing a demographic or product preference characteristic. In this embodiment a single value represents one probabilistic or deterministic value (e.g. the probability that the consumer is in the 18-24 year old 10 age group, or the weighting of an advertisement to the age group).

In an alternate embodiment a group of demographic or product characteristics forms an individual vector. As an example, age categories can be considered a vector, with 15 each component of the vector representing the probability that the consumer is in that age group. In this embodiment each vector can be considered to be a basis vector for the description of the consumer or the target ad. The consumer or ad characterization is comprised of a finite set of 20 vectors in a the vector space that describes the consumer or advertisement.

FIG. 4 shows the block diagram of a computer system for a realization of the consumer profiling system. A system bus 422 transports data amongst the CPU 203, the RAM 204, Read 25 Only Memory - Basic Input Output System (ROM-BIOS) 406 and other components. The CPU 203 accesses a hard drive 400 through a disk controller 402. The standard input/output devices are connected to the system bus 422 through the I/O controller 201. A keyboard is attached to the I/O controller 30 201 through a keyboard port 416 and the monitor is connected through a monitor port 418. The serial port device uses a serial port 420 to communicate with the I/O controller 201. Industry Standard Architecture (ISA) expansion slots 408 and Peripheral Component Interconnect (PCI) expansion slots 410

allow additional cards to be placed into the computer. In a preferred embodiment, a network card is available to interface a local area, wide area, or other network. The computer system shown in FIG. 4 can be part of consumer profile server 130, or can be a processor present in another element of the network.

FIG. 5 shows a context diagram for the present invention. Context diagrams are useful in illustrating the relationship between a system and external entities. 10 Context diagrams can be especially useful in developing object oriented implementations of a system, although use of a context diagram does not limit implementation of the present invention to any particular programming language. The present invention can be realized in a variety of 15 programming languages including but not limited to C, C++, Smalltalk, Java, Perl, and can be developed as part of a relational database. Other languages and data structures can be utilized to realize the present invention and are known to those skilled in the art.

20 Referring to FIG. 5, in a preferred embodiment consumer profiling system 500 is resident on consumer profile server 130. Point of purchase records 510 are transmitted from point of purchase 110 and stored on consumer profile server 130. Heuristic rules 530, pricing policy 570, and consumer profile 560 are similarly stored on consumer profile server 130. In a preferred embodiment advertisement records 540 are stored on ad server 146 and connectivity between advertisement records 540 and consumer profiling system 500 is via the Internet or other network.

30 In an alternate embodiment the entities represented in FIG. 5 are located on servers which are interconnect via the Internet or other network.

Consumer profiling system 500 receives purchase information from a point of purchase, as represented by

point of purchase records 510. The information contained within the point of purchase records 510 includes a consumer ID 512, a product ID 514 of the purchased product, the quantity 516 purchased and the price 518 of the product. In 5 a preferred embodiment, the date and time of purchase 520 are transmitted by point of purchase records 510 to consumer profiling system 500.

The consumer profiling system 500 can access the consumer profile 560 to update the profiles contained in it. 10 Consumer profiling system 500 retrieves a consumer characterization vector 562 and a product preference vector 564. Subsequent to retrieval one or more data processing algorithms are applied to update the vectors. An algorithm for updating is illustrated in the flowchart in FIG. 8A. The 15 updated vectors termed herein as new demographic characterization vector 566 and new product preference 568 are returned to consumer profile 560 for storage.

Consumer profiling system 500 can determine probabilistic consumer demographic characteristics based on 20 product purchases by applying heuristic rules 519. Consumer profiling system 500 provides a product ID 514 to heuristic rules records 530 and receives heuristic rules associated with that product. Examples of heuristic rules are illustrated in FIG. 7.

25 In a preferred embodiment of the present invention, consumer profiling system 500 can determine the applicability of an advertisement to the consumer 100. For determination of the applicability of an advertisement, a correlation request 546 is received by consumer profiling 30 system 500 from advertisements records 540, along with consumer ID 512. Advertisements records 540 also provides advertisement characteristics including an ad demographic vector 548, an ad product category 552 and an ad product preference vector 554.

Application of a correlation process, as will be described in accordance with FIG. 8B, results in a demographic correlation 556 and a product correlation 558 which can be returned to advertisement records 540. In a preferred embodiment, advertiser 144 uses product correlation 558 and demographic correlation 556 to determine the applicability of the advertisement and to determine if it is worth purchasing the opportunity. In a preferred embodiment, pricing policy 570 is utilized to determine an ad price 570 which can be transmitted from consumer profiling system 500 to advertisement records 540 for use by advertiser 144.

Pricing policy 570 is accessed by consumer profiling system 500 to obtain ad price 572. Pricing policy 570 takes into consideration results of the correlation provided by the consumer profiling system 500. An example of pricing schemes are illustrated in FIG. 9

FIGS. 6A and 6B illustrate pseudocode for the updating process and for a correlation operation respectively. The updating process involves utilizing purchase information in conjunction with heuristic rules to obtain a more accurate representation of consumer 100, stored in the form of a new demographic characterization vector 562 and a new product preference vector 568.

As illustrated in the pseudocode in FIG. 6A the point of purchase data are read and the products purchase are integrated into the updating process. Consumer profiling system 500 retrieves a product demographics vector obtained from the set of heuristic rules 519 and applies the product demographics vector to the demographics characterization vector 562 and the product preference vector 564 from the consumer profile 560.

The updating process as illustrated by the pseudocode in FIG. 6A utilizes a weighting factor which determines the

importance of that product purchase with respect to all of the products purchased in a particular product category. In a preferred embodiment the weight is computed as the ratio of the total of products with a particular product ID 514 purchased at that time, to the product total purchase, which is the total quantity of the product identified by its product ID 514 purchased by consumer 100 identified by its consumer ID 512, purchased over an extended period of time. In a preferred embodiment the extended period of time is one year.

In the preferred embodiment the product category total purchase is determined from a record containing the number of times that consumer 100 has purchased a product identified by a particular product ID.

15 In an alternate embodiment other types of weighting factors, running averages and statistical filtering techniques can be used to use the purchase data to update the demographic characterization vector. The system can also be reset to clear previous demographic characterization 20 vectors and product preference vectors.

The new demographic characterization vector 566 is obtained as the weighted sum of the product demographics vector the demographic characterization vector 562. The same procedure is performed to obtain the new product preference 25 vector 568. Before storing those new vectors, a normalization is performed on the said new vectors. When used herein the term product characterization information refers product demographics vectors, product purchase vectors or heuristic rules, all of which can be used in the 30 updating process. The product purchase vector refers to the vector which represents the purchase of a item represented by a product ID. As an example, a product purchase vector for the purchase of Kellogg's CORN FLAKES in a 32 oz. size has a product purchase vector with a unity value for

5 Kellogg's CORN FLAKES and in the 32 oz. size. In the updating process the weighted sum of the purchase as represented by the product purchase vector is added to the product preference vector to update the product preference vector, increasing the estimated probability that the consumer will purchase Kellogg's CORN FLAKES in the 32 oz. size.

10 In FIG. 6B the pseudocode for a correlation process is illustrated. Consumer profiling system 500, after receiving the product characteristics and the consumer ID 512 from the advertisement records retrieves the consumer demographic characterization vector 562 and its product preference vector 564. The demographic correlation is the correlation between the demographic characterization vector 562 and the 15 ad demographics vector. The product correlation is the correlation between the ad product preference vector 554 and the product preference vector 564.

20 In a preferred embodiment the correlation process involves computing the dot product between vectors. The resulting scalar is the correlation between the two vectors.

25 In an alternate embodiment, as illustrated in FIG. 10, the basis vectors which describe aspects of the consumer can be used to calculate the projections of the ad vector on those basis vectors. In this embodiment, the result of the ad correlation can itself be in vector form whose components 30 represent the degree of correlation of the advertisement with each consumer demographic or product preference feature. As shown in FIG. 10 the basis vectors are the age of the consumer 1021, the income of the consumer 1001, and the family size of the consumer 1031. The ad characterization vector 1500 represents the desired characteristics of the target audience, and can include product preference as well as demographic characteristics.

In this embodiment the degree of orthogonality of the basis vectors will determine the uniqueness of the answer. The projections on the basis vectors form a set of data which represent the corresponding values for the parameter measured in the basis vector. As an example, if household income is one basis vector, the projection of the ad characterization vector on the household income basis vector will return a result indicative of the target household income for that advertisement.

10 Because basis vectors cannot be readily created from some product preference categories (e.g. cereal preferences) an alternate representation to that illustrated in FIG. 2C can be utilized in which the product preference vector represents the statistical average of purchases of cereal in 15 increasing size containers. This vector can be interpreted as an average measure of the cereal purchased by the consumer in a given time period.

20 The individual measurements of correlation as represented by the correlation vector can be utilized in determining the applicability of the advertisement to the subscriber, or a sum of correlations can be generated to represent the overall applicability of the advertisement.

25 In a preferred embodiment individual measurements of the correlations, or projections of the ad characteristics vector on the consumer basis vectors, are not made available to protect consumer privacy, and only the absolute sum is reported. In geometric terms this can be interpreted as disclosure of the sum of the lengths of the projections rather than the actual projections themselves.

30 In an alternate embodiment the demographic and product preference parameters are grouped to form sets of paired scores in which elements in the consumer characterization vector are paired with corresponding elements of the ad characteristics vector. A correlation coefficient such as

the Pearson product-moment correlation can be calculated. Other methods for correlation can be employed and are well known to those skilled in the art.

When the consumer characterization vector and the ad 5 characterization vector are not in a standardized format, a transformation can be performed to standardize the order of the demographic and product preferences, or the data can be decomposed into sets of basis vectors which indicate particular attributes such as age, income or family size.

10 FIG. 7 illustrates an example of heuristic rules including rules for defining a product demographics vector. From the product characteristics, a probabilistic determination of household demographics can be generated. Similarly, the monthly quantity purchased can be used to 15 estimate household size. The heuristic rules illustrated in FIG 7 serve as an example of the types of heuristic rules which can be employed to better characterize consumer 100 as a result of their purchases. The heuristic rules can include any set of logic tests, statistical estimates, or market 20 studies which provide the basis for better estimating the demographics of consumer 100 based on their purchases.

In FIG. 8A the flowchart for updating the consumer characterization vectors is depicted. The system receives data from the point of purchase at receive point of purchase 25 information step 800. The system performs a test to determine if a deterministic demographic characterization vector is available at deterministic demographic information available step 810 and, if not, proceeds to update the demographic characteristics.

30 Referring to FIG. 8A, at read purchase ID info step 820, the product ID 514 is read, and at update consumer demographic characterization vector step 830, an algorithm such as that represented in FIG. 6A is applied to obtain a new demographic characterization vector 566, which is stored

in the consumer profile 560 at store updated demographic characterization vector step 840.

The end test step 850 can loop back to the read purchase ID info 820 if all the purchased products are not yet processed for updating, or continue to the branch for updating the product preference vector 564. In this branch, the purchased product is identified at read purchase ID info step 820. An algorithm, such as that illustrated in FIG. 6A for updating the product preference vector 564, is applied in update product preference vector step 870. The updated vector is stored in consumer profile 560 at store product preference vector step 880. This process is carried out until all the purchased items are integrated in the updating process.

FIG. 8B shows a flowchart for the correlation process. At step 900 the advertisement characteristics described earlier in accordance with FIG. 5 along with the consumer ID are received by consumer profiling system 500. At step 910 the demographic correlation 556 is computed and at step 920 the product preference correlation 558 is computed. An illustrative example of an algorithm for correlation is presented in FIG. 6b. The system returns demographic correlation 556 and product preference correlation 558 to the advertisement records 540 before exiting the procedure at end step 950.

FIG. 9 illustrates two pricing schemes, one for content/opportunity provider 160 based pricing 970, which shows increasing cost as a function of correlation. In this pricing scheme, the higher the correlation, the more the content/opportunity provider 160 charges to air the advertisement.

FIG. 9 also illustrates consumer based pricing 960, which allows a consumer to charge less to receive

advertisements which are more highly correlated with their demographics and interests.

As an example of the industrial applicability of the invention, a consumer 100 can purchase items in a grocery store which also acts as a profiler 140 using a consumer profiling system 500. The purchase record is used by the profiler to update the probabilistic representation of customer 100, both in terms of their demographics as well as their product preferences. For each item purchased by consumer 100, product characterization information in the form of a product demographics vector and a product purchase vector is used to update the demographic characterization vector and the product preference vector for consumer 100.

A content/opportunity provider 160 may subsequently determine that there is an opportunity to present an advertisement to consumer 100. Content/opportunity provider 160 can announce this opportunity to advertiser 144 by transmitting the details regarding the opportunity and the consumer ID 512. Advertiser 144 can then query profiler 140 by transmitting consumer ID 512 along with advertisement specific information including the correlation request 546 and ad demographics vector 548. The consumer profiling system 500 performs a correlation and determines the extent to which the ad target market is correlated with the estimated demographics and product preferences of consumer 100. Based on this determination advertiser 144 can decide whether to purchase the opportunity or not.

Although this invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made which clearly fall within the scope of the invention. The invention is intended to be protected broadly within the spirit and scope of the appended claims.

Claims

What is claimed is:

1. A method for profiling a consumer based on consumer purchases, said method comprising the steps of:
 - (a) receiving a computer-readable detailed purchase record of said consumer wherein said computer-readable detailed purchase record has an associated unique consumer identification;
 - (b) retrieving product characterization information;
 - (c) calculating a consumer characterization vector from said computer-readable detailed purchase record and said product characterization information;
 - (d) storing said consumer characterization vector on a computer-readable medium.
2. The method described in claim 1 wherein said consumer characterization vector contains a demographic characterization of said consumer.
3. The method described in claim 1 wherein said consumer characterization vector contains a product preference characterization of said consumer.
4. A method for profiling consumer demographics based on consumer purchases, said method comprising the steps of:
 - (a) receiving a computer-readable detailed purchase record of a consumer wherein said computer-readable detailed purchase record has an associated unique consumer identification, and wherein said computer-readable detailed purchase record contains information regarding the purchase of an item;

(b) retrieving a demographic characterization vector wherein said demographic characterization vector is retrieved based on said associated unique consumer identification and wherein said demographic characterization vector contains a probabilistic measure of the demographic characteristics of said consumer;

(c) retrieving a set of heuristic rules wherein said set of heuristic rules contains a probabilistic measure of the demographic characteristics of a purchaser of said item;

(d) calculating a new demographic characterization vector from said demographic characterization vector and said set of heuristic rules;

(e) storing said new demographic characterization vector on a computer-readable medium.

5. The method described in claim 4 wherein said set of heuristic rules is in the form of a product demographics vector.

6. The method described in claim 5 wherein said new demographic characterization vector in step (d) is calculated as a weighted average of said product demographics vector and said demographic characterization vector.

7. The method described in claim 6 wherein said weighted average is determined based on a weighting factor, wherein said weighting factor is determined as the ratio of a current product purchase amount to a cumulative product purchase amount.

8. A method for profiling consumer preferences based on consumer purchases, said method comprising the steps of:

- (a) receiving a computer-readable detailed purchase record of a consumer wherein said detailed purchase record has an associated unique consumer identification, and wherein said computer-readable detailed purchase record contains information regarding a purchased item;
- (b) retrieving a product preference vector wherein said product preference vector is retrieved based on said associated unique consumer identification and wherein said product preference vector contains a measure of the characteristics of prior purchases by said consumer;
- (c) creating a product purchase vector from said computer-readable detailed purchase record wherein said product purchase vector contains a representation of at least one feature of said purchased item;
- (d) calculating a new product preference vector from said product preference vector and said product purchase vector;
- (e) storing said new product preference vector on a computer-readable medium.

9. The method described in claim 8 wherein said new product preference vector in step (d) is calculated as a weighted average of said product preference vector and said product purchase vector.

10. The method described in claim 9 wherein said weighted average is determined based on a weighting factor, wherein said weighting factor is determined as the ratio of a

current product purchase amount to a cumulative product purchase amount.

11. A data processing system for profiling a consumer, said data processing system comprising:

- (a) computer processing means for processing data;
- (b) storage means for storing data on a storage medium;
- (c) first means for retrieving a consumer characterization vector;
- (d) second means for receiving a computer-readable detailed purchase record of said consumer wherein said detailed purchase record has an associated unique consumer identification;
- (e) third means for updating said consumer characterization vector based on creating a weighted sum of product characterization information with said consumer characterization vector, wherein an updated consumer characterization vector is stored on said storage medium.

12. The data processing system described in claim 11 wherein said consumer characterization vector contains a demographic characterization of said consumer.

13. The data processing system described in claim 11 wherein said consumer characterization vector contains a product preference characterization of said consumer.

14. A computer program embodied on a computer-readable medium for profiling a consumer based on the purchase of at least one item, said computer program comprising:

- (a) a consumer purchase source code segment for receiving a detailed consumer purchase record wherein said detailed consumer purchase record has an associated unique consumer identification;
- (b) a updating code segment for retrieving a consumer characterization vector and updating said consumer characterization vector based on creating a weighted sum of product characterization information with said consumer characterization vector;
- (c) a storage source code segment for storing said consumer characterization vector on a computer-readable medium.

15. The computer program described in claim 14 wherein said a consumer purchase source code segment for receiving a detailed consumer purchase record supports the reception of said associated unique consumer identification from a network interface.

16. In a networked environment having a plurality of computers interconnected for the purpose of instantaneously transmitting and receiving data, a method for determining the applicability of an advertisement to a consumer, said method comprising the steps of:

- (a) receiving a computer-readable ad characterization vector at a first computer wherein said computer-readable ad characterization vector contains a description of discretionary characteristics

which correspond to a target group for said advertisement;

- (b) receiving a unique consumer ID at said first computer;
- (c) retrieving a consumer characterization vector from storage in said first computer based on said unique consumer ID;
- (d) calculating a correlation factor between said computer-readable ad characterization vector and said consumer characterization vector;
- (e) transmitting said correlation factor from said first computer to a second computer.

17. The method described in claim 16 wherein said consumer characterization vector contains a demographic characterization of said consumer and wherein said computer readable ad characterization vector contains a demographic characterization of the target market for said advertisement.

18. The method described in claim 16 wherein said consumer characterization vector contains a product preference characterization of said consumer and wherein said computer-readable ad characterization vector contains a product preference target market for said advertisement.

19. The method described in claim 16 wherein said correlation factor is calculated as the scalar product of said consumer characterization vector and said ad characterization vector.

20. The method described in claim 16, further comprising the steps of:

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(f) determining a price to present said advertisement, wherein said price is a function of said correlation factor.

21. The method described in claim 20 wherein said price is an increasing monotonic function of said correlation factor.

22. The method described in claim 20 wherein said price is a decreasing monotonic function of said correlation factor.

23. In a networked environment having a plurality of computers interconnected for the purpose of instantaneously transmitting and receiving data, a method for targeting an advertisement to consumers of a specific good, said method comprising the steps of:

- (a) receiving a computer-readable advertisement characterization vector at a first computer wherein said advertisement characterization vector contains a description of a target market, and wherein said description of said target market contains at least one indicator corresponding to a target product;
- (b) receiving a unique consumer ID at said first computer;
- (c) retrieving a consumer characterization vector from a storage unit in said first computer based on said unique consumer ID wherein said consumer characterization vector contains a plurality of purchase indicators, said purchase indicators representing previous purchases of said consumer; and
- (d) calculating a correlation factor between said advertisement characterization vector and said consumer characterization vector;

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- (e) transmitting said correlation factor to a second computer.

24. The method described in claim 23, further comprising the steps of:

- (f) determining a price to present said advertisement, wherein said price is a function of said correlation factor.

25. The method described in claim 24 wherein said price is an increasing monotonic function of said correlation factor.

26. The method described in claim 24 wherein said price is a decreasing monotonic function of said correlation factor.

27. A data processing system for determining the applicability of an advertisement to a consumer and for determining a price for displaying said advertisement, said data processing system comprising:

- (a) computer processing means for processing data;
- (b) storage means for storing data on a storage medium;
- (c) first means for receiving an ad characterization vector wherein said ad characterization vector corresponds to said advertisement;
- (d) second means for receiving a unique consumer ID;
- (e) third means for retrieving a consumer characterization vector based on said unique consumer ID;
- (f) fourth means for determining a correlation factor wherein said correlation factor is

determined from the correlation of said ad vector with said consumer characterization vector;

(g) fifth means for retrieving a pricing function;

(h) sixth means for determining said price for displaying said advertisement to said consumer wherein said price is determined from said correlation factor and said pricing function.

28. The data processing system described in claim 27 wherein said consumer characterization vector contains a demographic characterization of said consumer.

29. The data processing system described in claim 27 wherein said consumer characterization vector contains a product preference characterization of said consumer.

30. The data processing system described in claim 27 wherein said price is an increasing monotonic function of said correlation factor.

31. The method described in claim 27 wherein said price is a decreasing monotonic function of said correlation factor.

32. A computer program embodied on a computer-readable medium for determining the applicability of an advertisement to a consumer, said computer program comprising:

- (a) an advertisement source code segment for receiving an ad characterization vector;
- (b) a consumer characterization code segment for receiving a unique consumer ID and retrieving

a consumer characterization vector corresponding to said unique consumer ID;

(c) a correlating source code segment for calculating a correlation factor between said ad characterization vector and said consumer characterization vector.

33. The computer program described in claim 32. further comprising:

(d) a transmitting source code segment for transmitting said correlation factor.

34. A method for constructing a subscriber characterization vector and for allowing access to the subscriber characterization vector without revealing specific viewing habits, the method comprising the steps of:

(a) creating a record of the viewing habits of at least one subscriber in a household;

(b) determining a subscriber characterization vector based on the record of the viewing habits, wherein the subscriber characterization vector does not contain specific viewing information; and

(c) allowing access to the subscriber characterization vector to determine applicability of an advertisement.

35. The method of claim 34 wherein access to the subscriber characterization vector is performed by allowing correlation of an advertisement characterization vector with the subscriber characterization vector.

36. A method for constructing a consumer characterization vector and for allowing access to the consumer

characterization vector without revealing specific purchases, the method comprising the steps of:

- (a) creating a record of purchases;
- (b) determining a consumer characterization vector based on the purchases, wherein the consumer characterization vector does not contain specific purchase information; and
- (c) allowing access to the consumer characterization vector to determine applicability of an advertisement.

37. The method of claim 36 wherein access to the subscriber characterization vector is performed by allowing correlation of an advertisement characterization vector with the consumer characterization vector.

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5 38. A method for profiling a consumer based on
multiple purchases made by the consumer that are accumulated
in detailed purchase records of the consumer, the method
comprising:

10 retrieving the detailed purchase records;
retrieving product characterization information
associated with products included in the detailed purchase
records; and

15 generating a profile of the consumer based on the
detailed purchase records and the product characterization
information.

39. The method described in claim 38, wherein the
consumer profile includes a demographic profile of the
consumer.

20 40. The method described in claim 38, wherein the
consumer profile includes a product preference profile of
the consumer.

25 41. The method of claim 38, wherein said generating a
profile includes generating a first consumer profile, and
further comprising storing the first consumer profile in a
storage medium.

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5 42. The method of claim 41, wherein said retrieving detailed purchase records includes retrieving first detailed purchase records, and further comprising

retrieving second detailed purchase records for the consumer, wherein the second detailed purchase records

10 include an inventory of the purchases of the consumer since the first profile was generated;

retrieving product characterization information associated with products included in the second detailed purchase records;

15 generating a second profile of the consumer based on the second detailed purchase records and the associated product characterization information;

calculating a third profile of the consumer from the first consumer profile and the second consumer profile.

20 43. The method of claim 42, wherein said calculating a third profile includes calculating the third consumer profile as a weighted average of the first consumer profile and the second consumer profile.

25 44. The method of claim 23, wherein the weighted average is a ratio of records in the first detailed purchase records to records in the second detailed purchase records.

30 45. The method of claim 38, wherein

5 said retrieving product characterization information includes retrieving a set of heuristic rules for products in the detailed purchase records, the set of heuristic rules defining a probabilistic measure of demographic characteristics of a purchaser of a product; and
10 said generating a profile of the consumer includes generating a demographic profile of the consumer from the detailed purchase records and the set of heuristic rules.

15 46. The method of claim 45, wherein the set of heuristic rules are in the form of a vector.

15 47. The method of claim 38, wherein said generating a profile of the consumer includes generating a product preference profile of the consumer based on the detailed purchase records.

20 48. The method of claim 47, wherein said generating a product preference profile includes determining a probability of the consumer purchasing a particular product.

25

49. The method of claim 47, wherein said generating a product preference profile includes determining a consumer preference for a particular brand of a product line.

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5 50. The method of claim 49, wherein the consumer
preference is a probabilistic measure based on purchases
within the product line contained in the detailed purchase
records.

10 51. The method of claim 49, wherein said generating a
product preference profile includes determining a consumer
preference for a particular attribute of a product line.

15 52. The method of claim 51, wherein the particular
attribute includes size.

53. The method of claim 38, wherein the multiple
purchases made by the consumer are point-of-sale
transactions.

20 54. The method of claim 38, wherein the multiple
purchases made by the consumer are accumulated from at least
two different locations.

25 55. The method of claim 38, wherein the consumer
profile is in the form of a vector.

56. A method for profiling a consumer based on
transactions performed by the consumer at multiple
30 locations, the transactions being recorded and accumulated

5 in detailed transaction records for the consumer, the method comprising:

retrieving the detailed transaction records, wherein the detailed transaction records include an inventory of the recorded transactions of the consumer; and

10 generating a profile of the consumer based on the detailed transaction records and a set of heuristic rules associated with transactions within the detailed transaction records, the set of heuristic rules defining a probabilistic measure of demographic characteristics of a person

15 performing the transactions.

57. The method of claim 56, wherein the multiple transactions include point-of-sale purchases.

20 58. The method of claim 57, wherein the multiple transactions further include television viewing transactions and Internet viewing transactions.

59. The method of claim 56, wherein said retrieving
25 the detailed transaction records includes:

storing the transactions performed by the consumer at multiple locations; and

generating the detailed transaction records based on the stored transactions, wherein the detailed transaction

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5 records includes a summary of the transactions over a predetermined time interval.

60. A method for updating an initial consumer profile based on multiple purchases made by the consumer and
10 accumulated in intermediate detailed purchase records of the consumer, the method comprising:

retrieving the initial profile of the consumer;

retrieving the intermediate detailed purchase records which include an inventory of the purchases of the consumer
15 for a predefined time frame;

generating an intermediate consumer profile based on the intermediate detailed purchase records; and

calculating a new consumer profile as a weighed average
of the initial consumer profile and the intermediate
20 consumer profile.

61. A system for profiling a consumer based on multiple purchases made by the consumer that are accumulated in detailed purchase records of the consumer, the system
25 comprising:

means for retrieving the detailed purchase records;

means for retrieving product characterization information associated with products included in the detailed purchase records; and

5 means for generating a profile of the consumer based on
the detailed purchase records and the product
characterization information.

62. The system of claim 61, wherein said means for
10 generating a profile generates a first consumer profile, and
further comprising a storage medium for storing the first
consumer profile.

63. The system of claim 62, wherein said means for
15 retrieving detailed purchase records retrieves first
detailed purchase records, and further comprising
means for retrieving second detailed purchase records
for the consumer, wherein the second detailed purchase
records include an inventory of the purchases of the
20 consumer since the first consumer profile was generated;
means for retrieving product characterization
information associated with products included in the second
detailed purchase records;
means for generating a second profile of the consumer
25 based on the second detailed purchase records and the
associated product characterization information; and
means for calculating a third profile of the consumer
from the first profile and the second profile.

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5 64. The system of claim 63, wherein said means for calculating a third profile calculates the third profile as a weighted average of the first profile and the second profile.

10 65. The system of claim 64, wherein said means for calculating a third profile includes means for determining the weighted average as a ratio of records in the first detailed purchase records to records in the second detailed purchase records.

15 66. The system of claim 61, wherein
said means for retrieving product characterization information includes means for retrieving a set of heuristic rules for products in the detailed purchase records, the set of heuristic rules defining a probabilistic measure of demographic characteristics of a purchaser of a product; and
20 said means for generating a profile of the consumer includes means for generating a demographic profile of the consumer from the detailed purchase records and the set of heuristic rules.

25 67. The system of claim 61, wherein said means for generating a profile of the consumer includes means for generating a product preference profile of the consumer based on the detailed purchase records.

5

68. The system of claim 61, wherein the multiple purchases made by the consumer are point-of-sale transactions.

10 69. The system of claim 61, wherein the multiple purchases made by the consumer are accumulated from at least two different locations.

15 70. A computer program embodied on a computer-readable medium for profiling a consumer based on transactions performed by the consumer at multiple locations, the transactions being recorded and accumulated in detailed transaction records for the consumer, the computer program comprising:

20 a source code segment for retrieving the detailed transaction records, wherein the detailed transaction records include an inventory of the recorded transactions of the consumer;

25 a source code segment for retrieving a set of heuristic rules associated with transactions within the detailed transaction records, the set of heuristic rules defining a probabilistic measure of demographic characteristics of a person performing the transactions; and

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5 a source code segment for generating a profile of the consumer based on the detailed transaction records and the set of heuristic rules.

71. The computer program of claim 70, wherein said
10 source code segment for retrieving detailed transaction records retrieves the detailed transaction records from a network interface.

72. The computer program of claim 70, further
15 comprising
a storage medium;
a source code segment for storing the consumer profile on the storage medium as a first consumer profile;
means for retrieving second detailed transaction
20 records for the consumer, wherein the second detailed transaction records include an inventory of the transactions of the consumer since the first profile was generated;
means for retrieving product characterization information associated with products included in the second
25 detailed purchase records;
means for generating a second profile of the consumer based on the second detailed purchase records and the associated product characterization information; and
means for calculating a third profile of the consumer
30 from the first profile and the second profile.

5

73. A method for selecting an advertisement to be presented to a consumer by determining the similarity between a profile of the consumer which is generated from detailed purchase records of the consumer and a profile of 10 the advertisement which identifies discretionary characteristics of an intended target market of the advertisement, the method comprising:

receiving the advertisement profile for the advertisement;

15 retrieving the consumer profile, wherein the detailed purchase records used to generate the consumer profile include multiple point-of-sale transactions; and calculating a correlation factor between the advertisement profile and the consumer profile.

20

74. The method described in claim 73, wherein the advertisement profile includes a demographic characterization of the intended target market; the consumer profile includes a demographic characterization of the consumer; and 25 said calculating a correlation factor includes calculating the correlation factor between the demographic characterization of the intended target market and the demographic characterization of the consumer.

30

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5 75. The method described in claim 73, wherein
 the advertisement profile includes a product preference
 characterization of the intended target market;
 the consumer profile includes a product preference
 characterization of the consumer; and
10 said calculating a correlation factor includes
 calculating the correlation factor between the product
 preference characterization of the intended target market
 and the product preference characterization of the consumer.

15 76. The method of claim 73, wherein said calculating a
 correlation factor includes calculating the correlation
 factor as a scalar product of the consumer profile and the
 advertisement profile.

20 77. The method of claim 73, further comprising
 determining a price to present the advertisement to the
 consumer, wherein the price is a function of the correlation
 factor.

25 78. The method of claim 77, wherein the price is an
 increasing monotonic function of the correlation factor.

79. The method of claim 77, wherein the price is a
decreasing monotonic function of the correlation factor.

30

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5 80. The method of claim 73, wherein the discretionary
characteristics include an indicator associated with a
particular product, and further comprising determining if
the detailed purchase records support the indicator
associated with the product.

10

81. The method of claim 80, wherein the associated
indicator includes previously purchased, never purchased, or
only purchases.

15 82. The method of claim 81, wherein said correlating
is only performed if the detailed purchase records support
the associated indicator.

20 83. The method of claim 73, wherein the detailed
purchase records are accumulated in at least one external
database.

25 84. The method of claim 73, wherein the multiple
point-of-sale transactions included in the detailed purchase
records are transacted at a plurality of locations.

30 85. The method of claim 73, further comprising
presenting the applicable advertisement to the consumer via
a television.

5 86. The method of claim 85, wherein the applicable
advertisement is transmitted to the television via a
telecommunications access system.

10 87. The method of claim 86, wherein the television
access system includes cable television systems, switched
digital video systems, and microwave telecommunications
systems.

15 88. The method of claim 73, further comprising
presenting the applicable advertisement to the consumer via
mail.

20 89. The method of claim 73, wherein the consumer
profile and the advertisement profile are in the form of
vectors.

25 90. A method for determining how applicable an
advertisement is to a consumer by comparing a profile of the
consumer which is generated from multiple transactions of
the consumer to a profile of the advertisement which
identifies discretionary characteristics of an intended
target market of the advertisement, the method comprising:

receiving the advertisement profile for the
advertisement;

5 retrieving the consumer profile, wherein the multiple
transactions used to generate the consumer profile include
purchases of the consumer from multiple points-of-sale; and
calculating a correlation factor between the
advertisement profile and the consumer profile.

10

91. The method of claim 90, wherein the multiple
transactions further include television viewing
transactions.

15

92. The method of claim 90, wherein said retrieving
the consumer profile includes

retrieving a detailed transaction record, wherein the
detailed transaction record includes an inventory of each of
the multiple transactions which occurred over a
predetermined time interval; and

generating the consumer profile from the detailed
transaction record.

93. The method of claim 92, wherein said retrieving
25 the consumer profile further includes retrieving a set of
heuristic rules associated with transactions within the
detailed transaction records, the set of heuristic rules
defining a probabilistic measure of demographic
characteristics of a person performing the transactions, and
30 said generating the consumer profile includes generating the

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5 consumer profile based on the detailed transaction record
and the set of heuristic rules.

94. The method of claim 92, wherein said retrieving
the detailed transaction record includes

10 storing each of the multiple transactions of the
consumer; and

generating the detailed transaction record based on the
stored transactions.

15 95. A system for selecting an advertisement to be
presented to a consumer by determining the similarity
between a profile of the consumer which is generated from
detailed purchase records of the consumer and a profile of
the advertisement which identifies discretionary
20 characteristics of an intended target market of the
advertisement, the system comprising:

a storage medium;

means for receiving the advertisement profile for the
advertisement;

25 means for retrieving the consumer profile, wherein the
detailed purchase records used to generate the consumer
profile include multiple point-of-sale transactions; and

means for calculating a correlation factor between the
advertisement profile and the consumer profile.

5 96. The system of claim 95, further comprising means
for accumulating detailed purchase records from a plurality
of point of sale transactions.

10 97. The system of claim 95, further comprising means
for accumulating detailed purchase records from a plurality
of locations.

15 98. The system of claim 95, further comprising
means for retrieving a pricing function; and
means for determining a price for displaying the
advertisement to the consumer, wherein the price is
determined from the correlation factor and the pricing
function.

20 99. The system of claim 95, further comprising means
for transmitting the advertisement to the consumer.

100. The system of claim 99, wherein the means for
transmitting is a television access system.

25

101. The system of claim 99, wherein the means for
transmitting is mail delivery.

30 102. The system of claim 95, wherein said means for
retrieving a consumer profile includes:

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5 means for retrieving the detailed purchase records of
the consumer;

means for retrieving a set of heuristic rules
associated with products included in the detailed purchase
records, wherein the set of heuristic rules define a
10 probabilistic measure of demographic characteristics of a
purchaser of corresponding products; and

means for generating the consumer profile from the
detailed purchase records and the set of heuristic rules.

15 103. A computer program embodied on a computer-readable
medium for determining how applicable an advertisement is to
a consumer by comparing a profile of the consumer which is
generated from multiple transactions of the consumer to a
profile of the advertisement which identifies specific
20 characteristics of an intended target market of the
advertisement, the computer program comprising:
a source code segment for receiving the advertisement
profile for the advertisement;

25 a source code segment for retrieving the consumer
profile, wherein the multiple transactions used to generate
the consumer profile include purchases of the consumer from
multiple points-of-sale; and

30 a source code segment for calculating a correlation
factor between the advertisement profile and the consumer
profile.

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104. The computer program described in claim 103,
further comprising a source code segment for transmitting
said correlation factor to advertisers.

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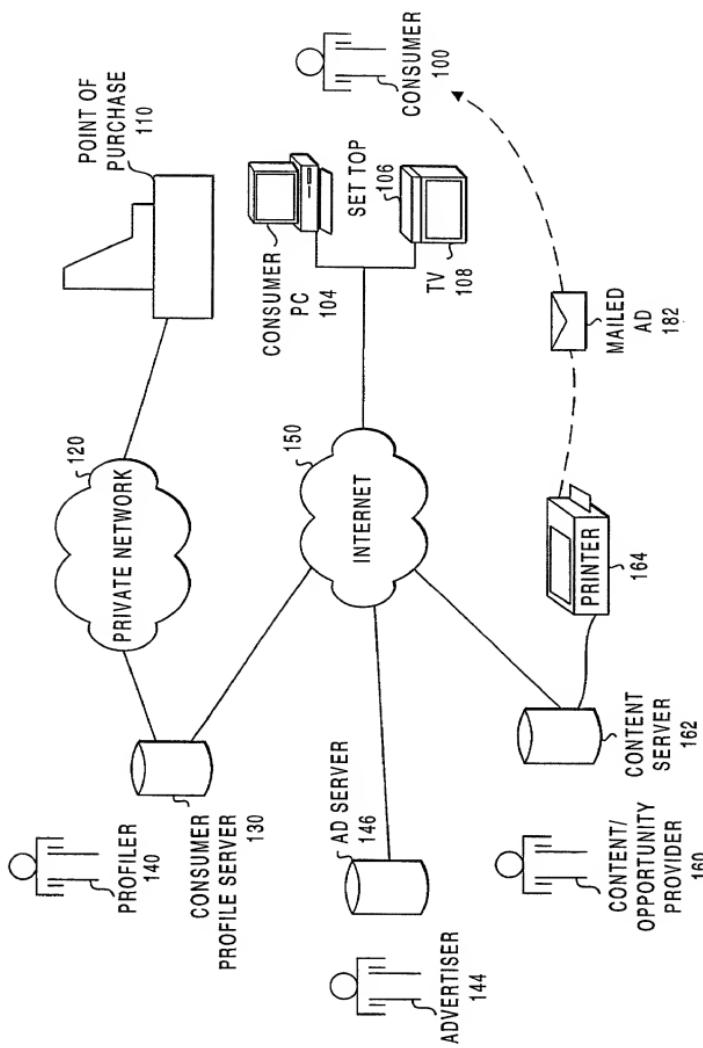


FIG. 1A

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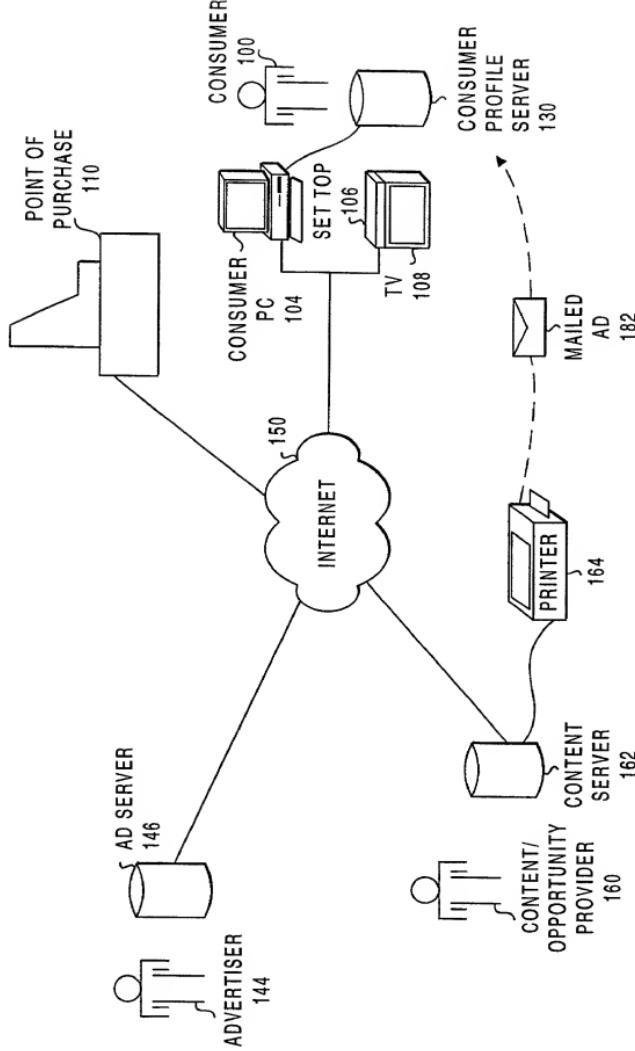


FIG. 1B

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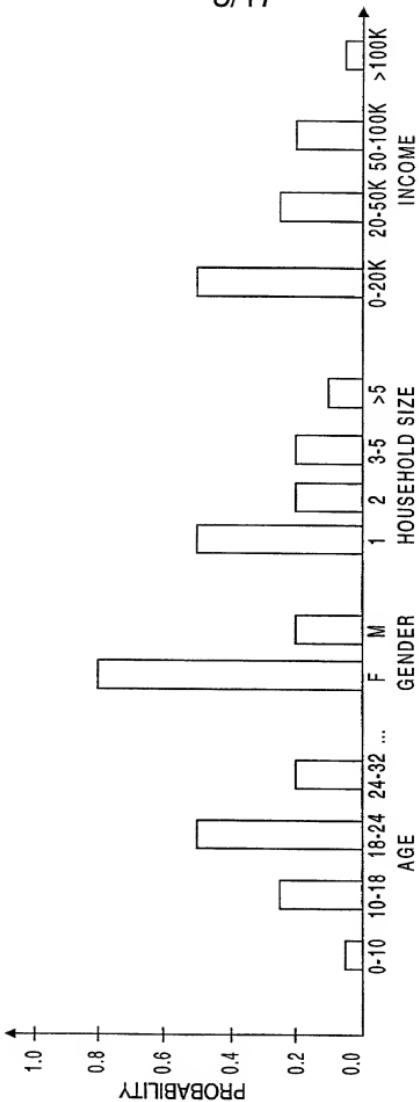


FIG. 2A

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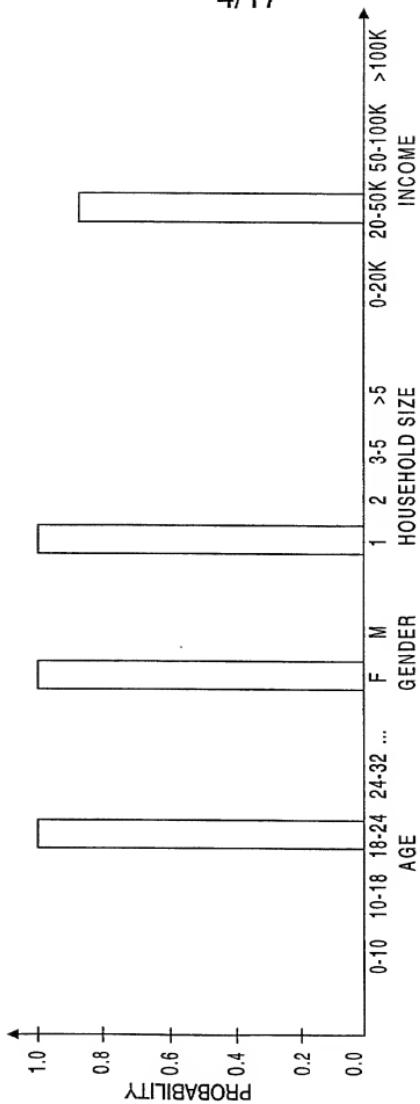


FIG. 2B

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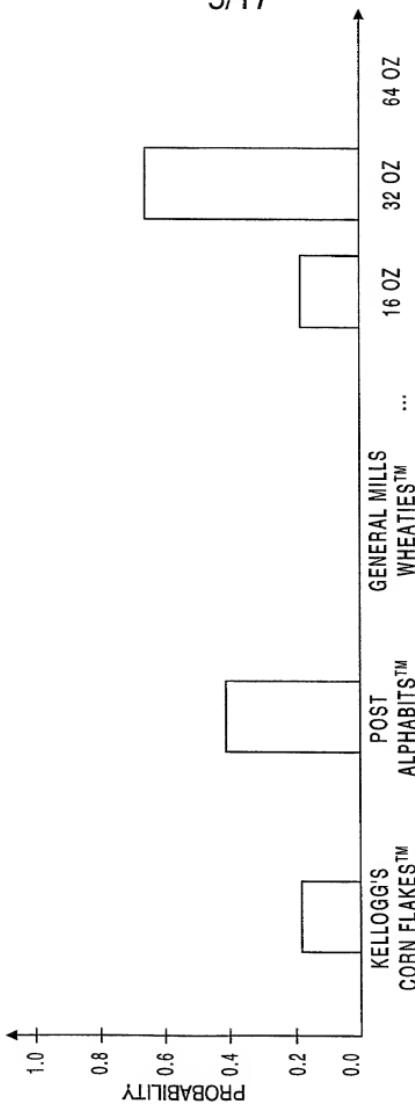
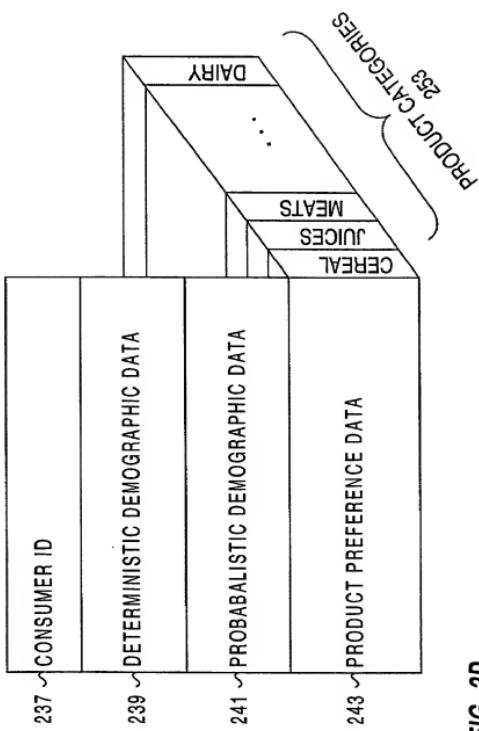


FIG. 2C

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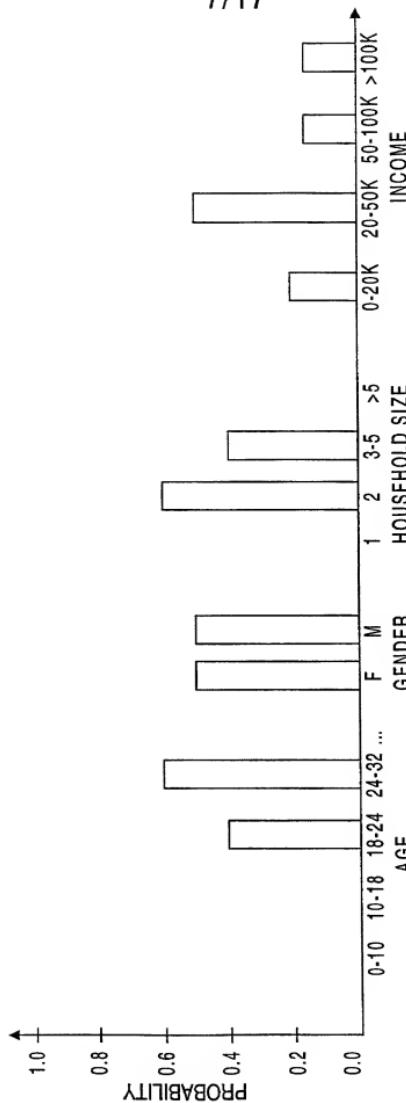


FIG. 3A

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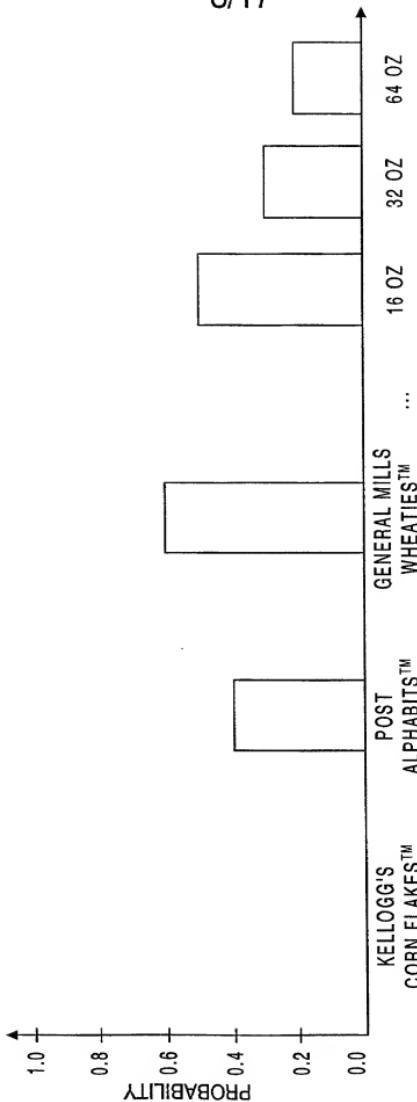


FIG. 3B

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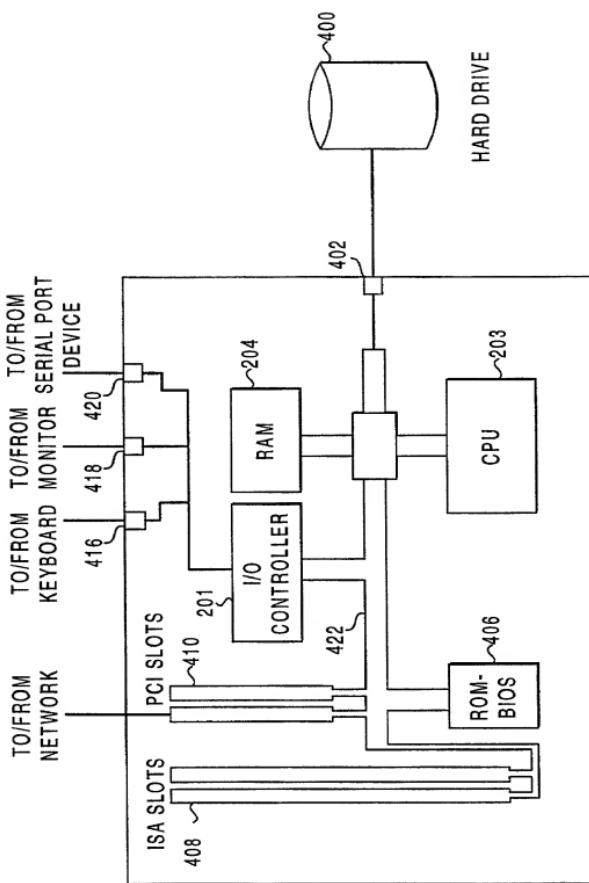


FIG. 4

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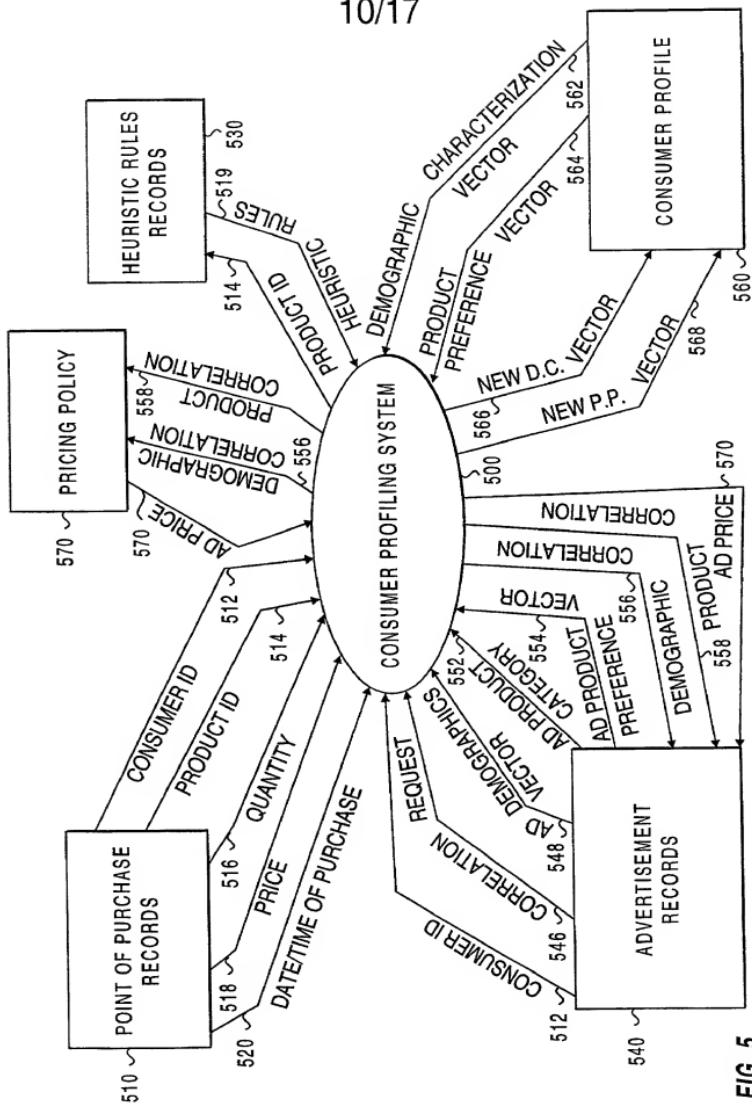


FIG. 5

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READ POP DATA
 FOR N=1 TO M
 READ PRODUCT ID
 RETRIEVE [PRODUCT DEMOGRAPHICS VECTOR]
 RETRIEVE [DEMOGRAPHIC CHARACTERIZATION VECTOR]
 RETRIEVE [PRODUCT PREFERENCE VECTOR]
 WEIGHT = PRODUCT TOTAL PURCHASE/PRODUCT CATEGORY
 TOTAL PURCHASE
 HOUSEHOLD DEMOGRAPHICS VECTOR =
 (WEIGHT) * (PRODUCT DEMOGRAPHICS VECTOR) +
 (DEMOGRAPHIC CHARACTERIZATION VECTOR)
 NORMALIZE [DEMOGRAPHIC CHARACTERIZATION VECTOR]
 STORE [DEMOGRAPHIC CHARACTERIZATION VECTOR]
 PRODUCT PREFERENCE VECTOR =
 (WEIGHT * PRODUCT PURCHASE VECTOR) + (PRODUCT
 PREFERENCE VECTOR)
 NORMALIZE [PRODUCT PREFERENCE VECTOR]
 STORE [PRODUCT PREFERENCE VECTOR]
 NEXT M

FIG. 6A

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TESTING & FINDINGS

```
READ [AD DEMOGRAPHIC VECTOR]
READ [AD PRODUCT CATEGORY, AD PRODUCT PREFERENCE VECTOR]
RETRIEVE [DEMOGRAPHIC CHARACTERIZATION VECTOR]
RETRIEVE [PRODUCT PREFERENCE VECTOR (PRODUCT CATEGORY)]
DEMOGRAPHIC CORRELATION = CORRELATE [DEMOGRAPHIC
CHARACTERIZATION VECTOR, AD DEMOGRAPHIC VECTOR]
PRODUCT PREFERENCE CORRELATION = CORRELATE [AD PRODUCT
PREFERENCE VECTOR, PRODUCT PREFERENCE VECTOR]
RETURN [DEMOGRAPHIC CORRELATION]
RETURN [PRODUCT PREFERENCE CORRELATION]
```

FIG. 6B

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TICKET ID: 2332060

PRODUCT DEMOGRAPHICS VECTOR				PRODUCT CHARACTERISTICS				PRODUCT DEMOGRAPHICS RULES				HEURISTIC RULES	
PRODUCT ID				PRODUCT ID: 2597251 BRAND: KELLOGG'S CORN FLAKES SIZE: 32 OZ PRICE: \$2.69				MONTHLY QUANTITY OF DIAPERS PURCHASED				ESTIMATED # OF CHILDREN <5	
HOUSEHOLD INCOME	≤20K	0.2			>5			>300				≥3	
HOUSEHOLD INCOME	20-40K	0.3			3-5			150-300				2-3	
HOUSEHOLD SIZE	0-2	0.1			3-4			50-150				1-2	
HOUSEHOLD SIZE	2-4	0.3			3-4			1-50				1	

FIG. 7

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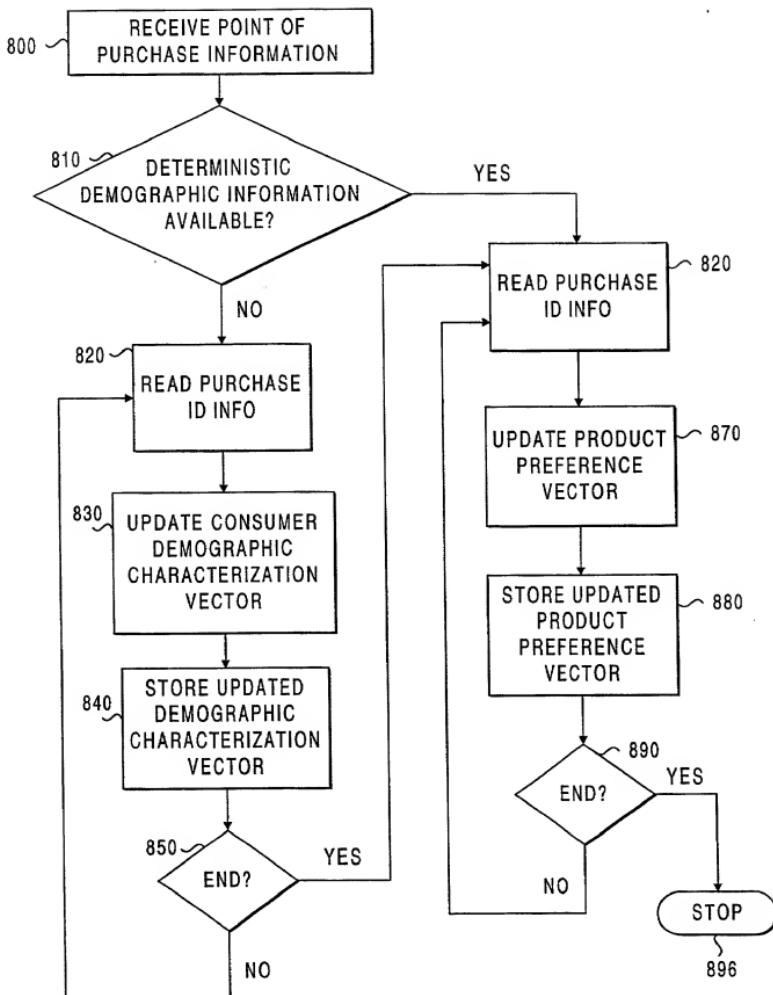


FIG. 8A

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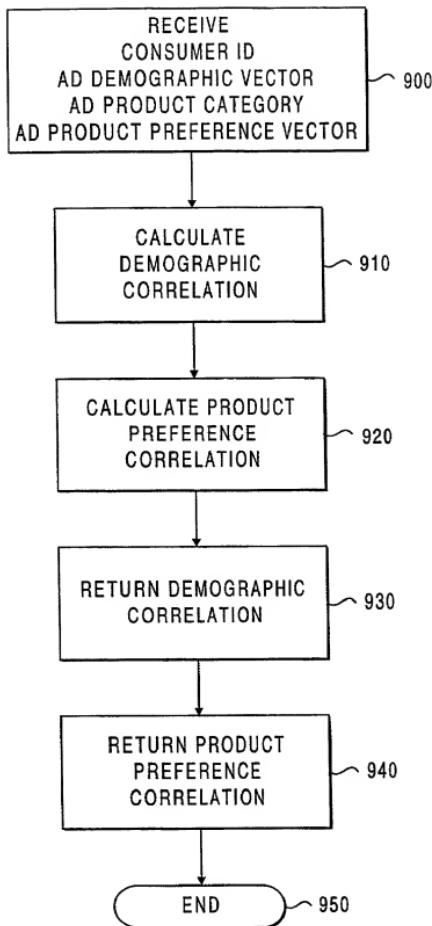


FIG. 8B

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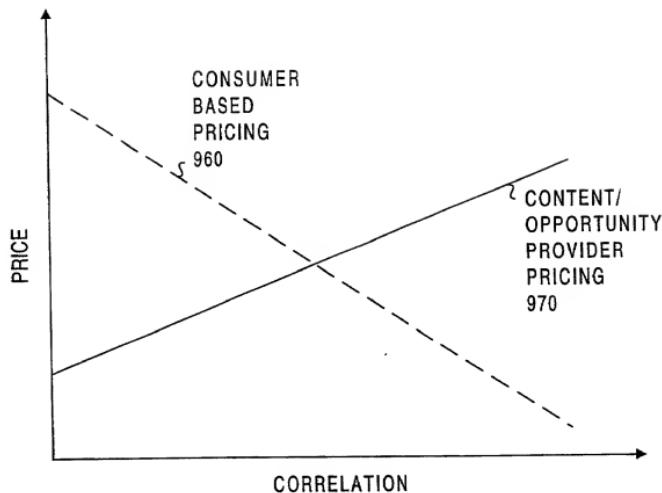


FIG. 9

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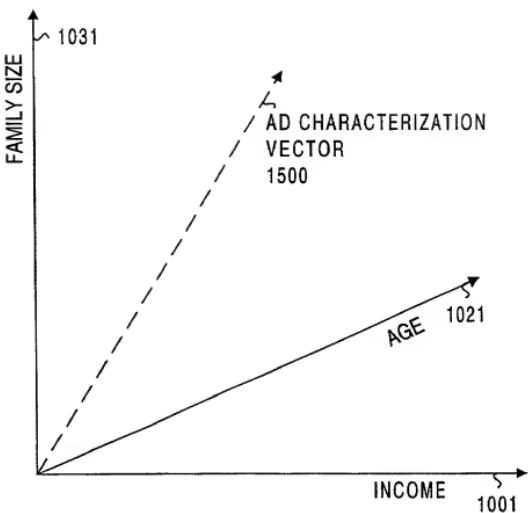


FIG. 10



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PTO/SB/01 (03-01)

Approved for use through 10/31/2002 OMB 0651-0032

U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

Declaration Submitted with Initial Filing

OR

Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	T706-11
First Named Inventor	ELDERING
COMPLETE IF KNOWN	
Application Number	UNKNOWN
Filing Date	UNKNOWN
Group Art Unit	UNKNOWN
Examiner Name	UNKNOWN

As a below named Inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

CONSUMER PROFILING AND ADVERTISEMENT SELECTION SYSTEM

(Title of the Invention)

the specification of which

is attached hereto

OR

was filed on (MM/DD/YYYY) 12/02/1999 as United States Application Number or PCT International

Application Number PCT/US99/28628 and was amended on (MM/DD/YYYY) 06/23/2000 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.					
NAME OF SOLE OR FIRST INVENTOR:		<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name <u>CHARLES</u> (first and middle [if any])			Family Name <u>ELDERING</u> or Surname		
Inventor's Signature <u>Charles Elder</u>		Date <u>04/12/01</u>			
Residence: <u>DOYLESTOWN</u>	State <u>PA</u>	PA	Country <u>USA</u>	US Citizenship	
214 COMMONS WAY Mailing Address					
City <u>DOYLESTOWN</u>	State <u>PA</u>	ZIP <u>18901</u>	Country <u>USA</u>		
NAME OF SECOND INVENTOR:		<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name <u></u> (first and middle [if any])			Family Name <u></u> or Surname		
Inventor's Signature		Date			
Residence: <u>City</u>	State	Country	Citizenship		
Mailing Address					
City	State	ZIP	Country		
<input type="checkbox"/> Additional inventors are being named on the _____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.					